AL-E77BK

JVC

SERVICE MANUAL

MODEL No. AL-E77BK

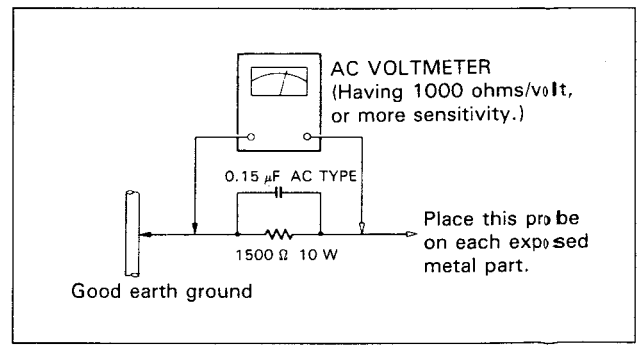
Contents

This manual combines two single volumes; Service manual and Parts list.

No. 2896
Feb. 1986

Safety Precautions

1. The design of this product contains special hardware, many circuits and components specially for safety purposes.
   For continued protection, no changes should be made to the original design unless authorized in writing by the manufacturer. Replacement parts must be identical to those used in the original circuits. Service should be performed by qualified personnel only.
2. Alterations of the design or circuitry of the product should not be made. Any design alterations or additions will void the manufacturer's warranty and will further relieve the manufacturer of responsibility for personal injury or property damage resulting therefrom.
3. Many electrical and mechanical parts in the product have special safety-related characteristics. These characteristics are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in the parts list of Service manual. Electrical components having such features are identified by shading on the schematics and by (⚠) on the parts list in Service manual. The use of a substitute replacement which does not have the same safety characteristics as the recommended replacement part shown in the parts list in Service manual may create shock, fire, or other hazards.
4. The leads in the products are routed and dressed with ties, clamps, tubings, barriers and/or the like to be separated from live parts, high temperature parts, moving parts and/or sharp edges for the prevention of electric shock and fire hazard.
   When service is required, the original lead routing and dress should be observed, and they should be confirmed to be returned to normal, after re-assembling.
5. Leakage current check
   (Safety for electrical shock hazard)
   After re-assembling the product, always perform an isolation check on the exposed metal parts of the Products (antenna terminals, knobs, metal cabinet, screw heads, headphone jack, control shafts, etc.) to be sure the product is safe to operate without danger of electrical shock.
   Do not use a line isolation transformer during this check.
   - Plug the AC line cord directly into the AC outlet. Using a "Leakage Current Tester", measure the leakage current from each exposed metal part of the cabinet, particularly any exposed metal part having a return path to the chassis, to a known good earth ground. Any leakage current must not exceed 0.5 mV AC (r.m.s.).
   - Alternate check method.
     Plug the AC line cord directly into the AC outlet. Use an AC voltmeter having 1,000 ohms per volt or more sensitivity in the following manner. Connect a 1500 Ω 10 W resistor paralleled by a 0.15 μF AC-type capacitor between an exposed metal part and a known good earth ground. Measure the AC voltage across the resistor with the AC voltmeter. Move the resistor connection to each exposed metal part, particularly any exposed metal part having a return path to the chassis, and measure the AC voltage across the resistor. Now, reverse the plug in the AC outlet and repeat each measurement. Any voltage measured must not exceed 0.75 V AC (r.m.s.). This corresponds to 0.5 mA AC (r.m.s.).

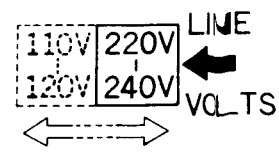


CHECKING YOUR LINE VOLTAGE

(Except for U.K., Continental Europe and Australia)

Before inserting the power plug, please check this setting to see that it corresponds with the line voltage in your area. If it doesn't, be sure to adjust the voltage selector switch to the proper setting before operating this equipment. The voltage selector switch is located underneath the platter.

CAUTION: Before selecting the "Voltage selector switch" to proper voltage, disconnect the power plug.



Technical Explanations

■ Programmed Tune Selection

1. Tune selecting method

This turntable is designed to use the tune select sensor incorporated in the cartridge, so tha relative position between the sensor and stylus is fixed.
When the turntable is activated in other than the manual mode, the tonearm moves over the record surface from the edge to the center before playback, and the positions of the gaps between tunes (the numbers of pulse in the rotary encoder) are stored in the microprocessor.
In programmed playback, the microprocessor commands the lowering of the tonearm at the designated gap positions (designated pulse count values) and lifts it up at the end of the designated tune.

2. Tune select circuit

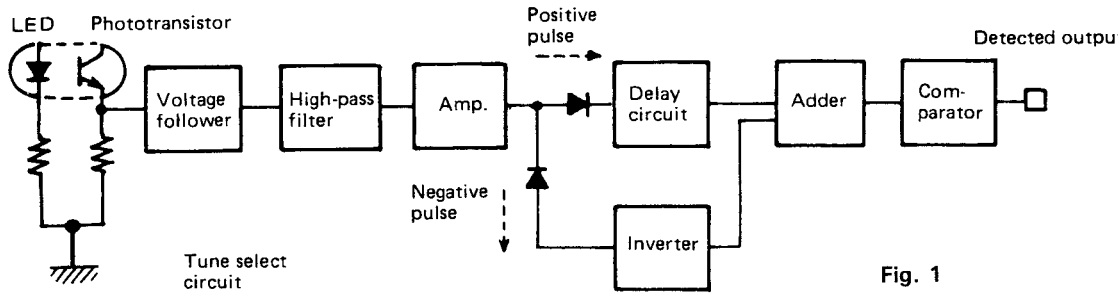


Fig. 1

The output signal from the phototransistor passes through the voltage follower which lowers the impedance. Then the signal passes through the high-pass filter in which the unnecessary DC levels are reduced and only the pulse outputs are picked up to be amplified.

In the delay circuit, the signal is separated into its leading and trailing edges before being amplified, then the positive pulse is delayed and the negative pulse is inverted before being added.
This circuit is also used in the previous model QL-E55; refer to the "Techanical Explanation" in its Service Manual (No. 11011).

3. Difference from previous models

Although the basic function of this turntable is almost same as the previous model, the position where the tonearm is lowered in the gap cannot be adjusted. Therefore, take care not to damage the stylus when replacing or cleaning the stylus or cartridge.

Model	Cartridge and tune select sensor	Microprocessor used
QL-G90B	Separate type	MB88401M-292K
L-E50B		MB88401M-277K or MB88401M-304K
L-E30B AL-E77BK	Integrated and fixed type	MB88401M-304K

■ IC901 (MB88401M-304K) Pin Functions

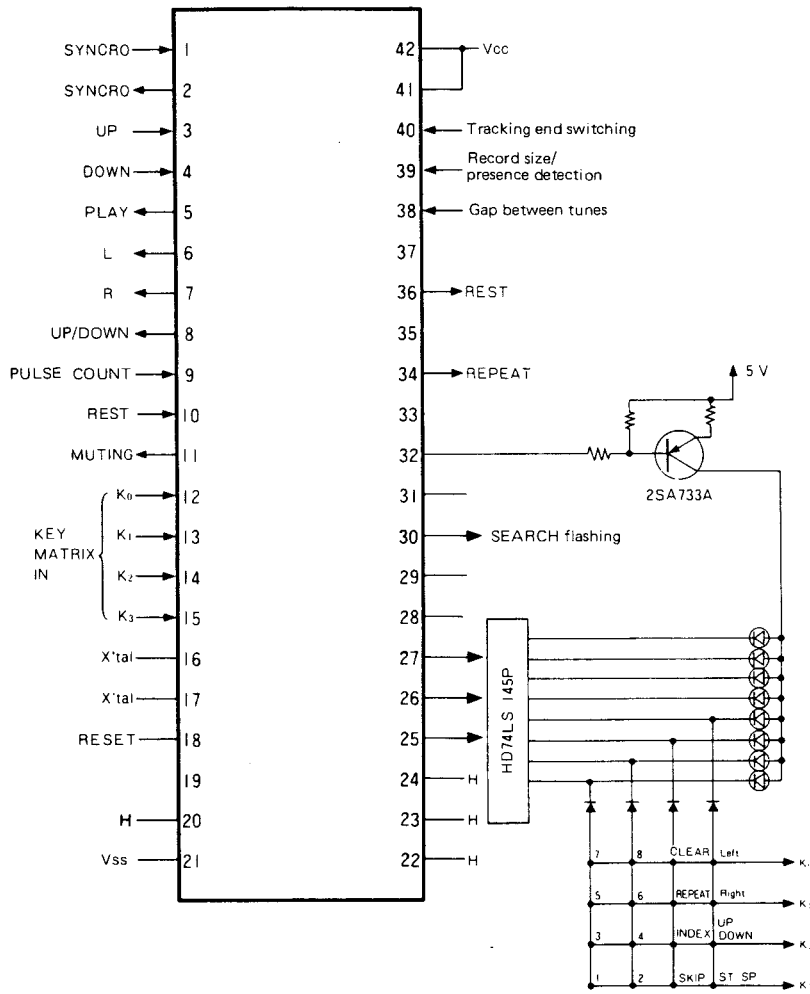
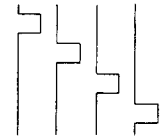


Fig. 2

PIN No.	PORT NAME	PORT TYPE	COMMENT
1	R_4	I	Synchro input pin
2	R_5	O	Synchro output pin
3	R_6	I	UP signal input pin — H ← UP
4	R_7	I	DOWN signal input pin — H ← DOWN
5	R_8	O	PLAY signal output pin — L ← PLAY
6	R_9	O	L signal output pin — L ← L
7	R_{10}	O	R signal output pin — L ← R
8	R_{11}	O	UP/DOWN signal output pin — L ← UP
9	R_{12}	I	PULSE COUNT input  (during tonearm movement)
10	R_{13}	I	REST signal input pin (approx. 10 msec cycle) — H ← REST
11	R_{14}	O	MUTING output pin — H ← MUTING ON
12	K_0	I	KEY MATRIX INPUT  (When any key is pressed.)
13	K_1		
14	K_2		
15	K_3		

PIN No.	PORT NAME	PORT TYPE	COMMENT	
16	EX		Microprocessor clock input pin	
17	X			4.17 MHz
18	RESET	I	Reset input pin	L ← RESET
19	IRQ	I		
20	TC	—		H
21	Vss	Power supply	0V	L
22	SC/TO	—		H
23	Si	—		H
24	SO	—		H
25	O_0	O	BCD output pin	
26	O_1			
27	O_2			
28	O_3	—		
29	O_4	—		
30	O_4	— O	SEARCH flashing (approx. 1 sec cycle)	(during search)
31	O_6	—		
32	O_7	O	LED OUT	
33	P_0	O		
34	P_1	O	REPEAT output pin	L ← REPEAT · ON
35	P_2	O		
36	P_3	O	REST output pin	L ← REST
37	R_0	I		
38	R_1	I	Gap between tunes input pin	H ← Gap between tunes
39	R_2	I	Record size and presence detection	H ← 17cm (30 cm outer edge) H ← None (on the platter mat)
40	R_3	I	PULSE COUNT switching	L ← 0 H ← −3
41	V_M	Power supply	5V	
42	V_{CC}			

Block Diagram

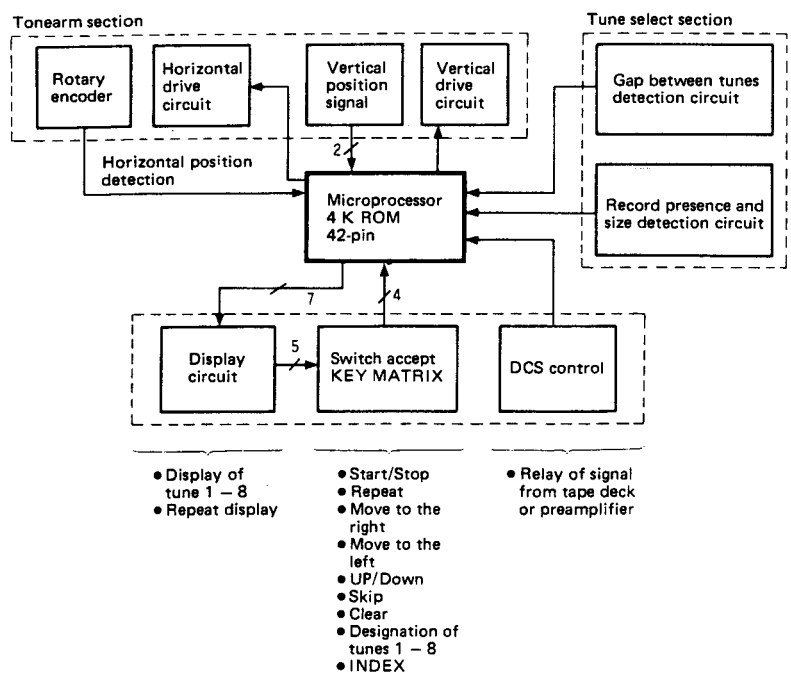


Fig. 3

Removal Procedures

■ Removal of the Dust Cover Ass'y

1. Remove two screws ① on both side panels, then remove two screws ② on the left and right of rear panel.
2. Remove the dust cover by lifting its both edges up softly.

Note when mounting:
The standard height of mechanism base is 11.5 mm from the surface of the cabinet. This value is the standard for each adjustment. Therefore, when mounting the dust cover, adjust to this value by using a tool, etc. on the left and right of the unit.

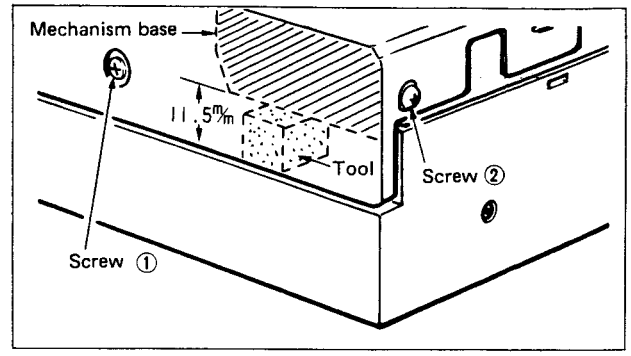


Fig. 4

■ Removal of the Front Escutcheon

1. Remove E ring holding the platter, and release the drive belt to remove the platter.
2. Remove three screws located on the front side of the bottom board.
3. Remove the escutcheon by lifting it up at an angle as shown in Fig. 5.

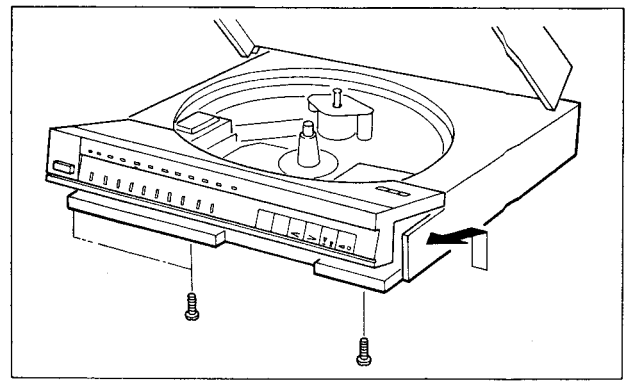


Fig. 5

Adjustment Procedures

■ Offset (Tracking Error) Adjustment

1. Remove the dust cover and front escutcheon.

Note:
- Check the standard height between the mechanism base and the cabinet. (11.5 mm: see Fig. 4)

2. Mount the platter and platter mat and load a record.
3. Connect the voltmeter between TP501 pins ④ and ① on the control P. C. Board.
4. Set the tonearm to the UP position and move it to the right so that the angle sensor (PI301) is opened.
5. Then, adjust VR501 so that the voltage between TP501 pins ④ and ① is DC 4.8 V ±0.05 V.
6. Move the tonearm back to the center, and adjust the screw in the tonearm rest part so that the voltage between TP501 pins ④ and ① is DC 1.9 V ~ 2.0 V in the tonearm DOWN mode.
   Clockwise direction: decreases the voltage
   Counterclockwise direction: increases the voltage

Notes:
- Repeat UP and DOWN several times so that the voltage in the DOWN mode is stabilized.
- Be sure to check the voltage in the DOWN mode.

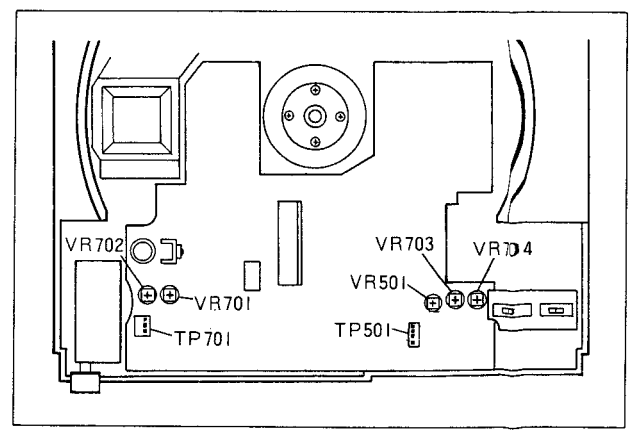


Fig. 6

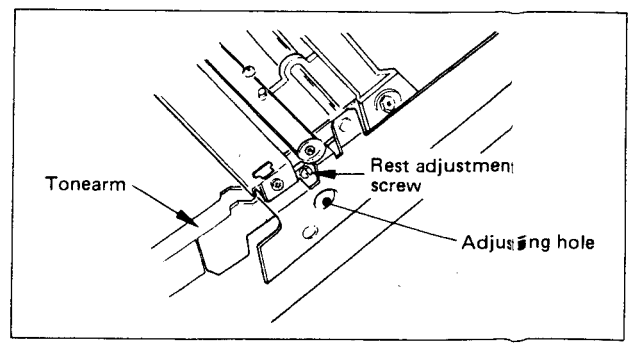


Fig. 7

■ Tonearm Lead-in Adjustment

1. **Remove the dust cover.**
   Note:
   Check the standard height (11.5 mm: see Fig. 4) between the mechanism base and the cabinet.
   Adjust the 30 cm record lead-in adjustment using the test record, then check the 17 cm record lead-in and lead-out functions.

	Test record	Count value	
30 cm record lead-in	Toshiba SS-4343	23±2	Adjust
17 cm record lead-in	Toshiba SS-4445	23±5	Check
17 cm record lead-out	Toshiba SS-4445	26±4	Check

When adjusting as described below, mount the dust cover and assemble in the normal condition. (Confirm the height difference between the cartridge and the record surface.)

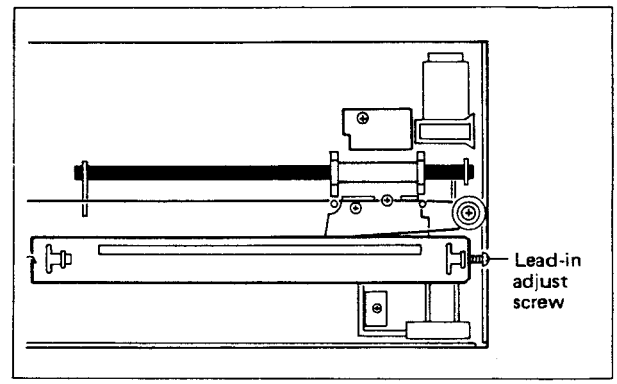


Fig. 8

■ Adjustment of Tune Selection Sensitivity (DC Sensitivity)

1. Play back the tune select sensitivity test record (RG5150) and move the tonearm to the non-recorded section at the center, then insert the test leads into the test points (+5-TP) and (DC-TP) and adjust VR701 (DC) so that the voltage of it is DC 1 V±0.1 V.

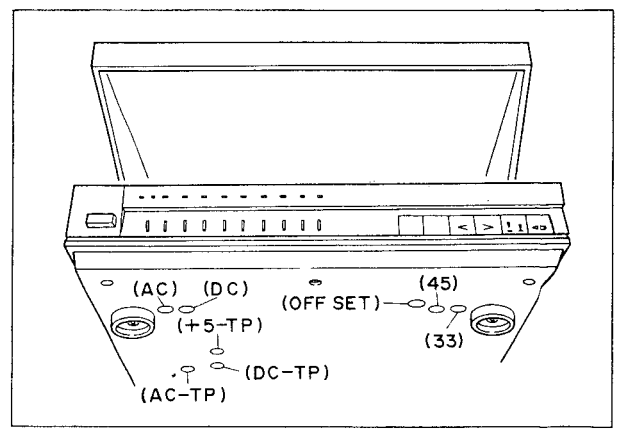


Fig. 9

■ Adjustment of Tune Selection Sensitivity (AC Sensitivity)

Preparations
1. Lift the tonearm using the cueing control.
2. Play the first tune of the test record (RG5150) at 33-1/3 r.p.m.
3. Connect an AC voltmeter (AVERAGE METER) between (+5-TP) and (AC-TP) as shown in Fig. 9.

Adjustment
1. Adjust VR702 so that the AC voltmeter reads 0.42 V.
2. At this time, since its pointer may swing, adjust the voltmeter so that 0.42 V is at the center between the maximum and minimum indications.

■ Motor Speed Adjustment

Make sure to adjust this at 45 r.p.m. first.
1. Set the speed select knob to 45 r.p.m. and play back the test record (RG-324) or strobe board, then adjust VR703 (45). Adjust VR704 (33) for 33 r.p.m. adjustment.

Cartridge Replacement

Remove the scrtridge fixing screw as shown in Fig. 10. Unsolder the lead wires soldered on the P. C. Board and remove the lead wires connected pins to replace the cartridge.

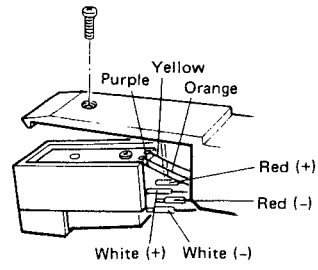


Fig. 10

Troubleshooting

■ Trouble with Tonearm Movement (Trouble in Lowering Down/Lifting Up Points and Tune Selection Sensitivity

Phenomena

1. The end section of the tune before the designated tune is played back, or the beginning of the designated tune is not played back.
2. The tonearm is raised in the middle of the tune, or the beginning of the next tune is played back.
3. A tune other than the designated tune is played back, or playback is done from the middle of a tune.
4. More or less tunes are programmed than the actual number of tunes on the record.
5. The tonearm is lowered down in the position of a 30 cm (12″) record when a 17 cm (7″) record is loaded.
6. The tonearm is lowered down in the position of a 17 cm (7″) record when no record is on the platter.

Causes

- **Phenomenon 1**

1. When the record has too narrow non-recorded sections between tunes.
2. When the record has too short recorded sections.
3. When the stylus is bent.
4. When the record is eccentric or has too large a center hole.
5. When the record surface has different reflectivity due to scratches or dusts.

- **Phenomenon 2**

1. When the offset is misadjusted . Adjust the offset again.

- **Phenomenon 3**

1. When the record has too large a pitch in the groove where the sound is recorded.
2. When the record has varying pitch in the groove where the sound is recorded.

} Adjust the tune selection sensitivity again.

- **Phenomenon 4**

1. When the sensor select knob is not set to the optimum position.

- **Phenomenon 5**

1. When the detection sensitivity of the sensor is too low.
2. When the edge of the platter is dusty.

- **Phenomenon 6**

1. When the platter mat is placed upside down.

Note:

- The platter mat of this unit is similar to previous models (QL-G90B, L-E50B). Check it referring to the figure below.

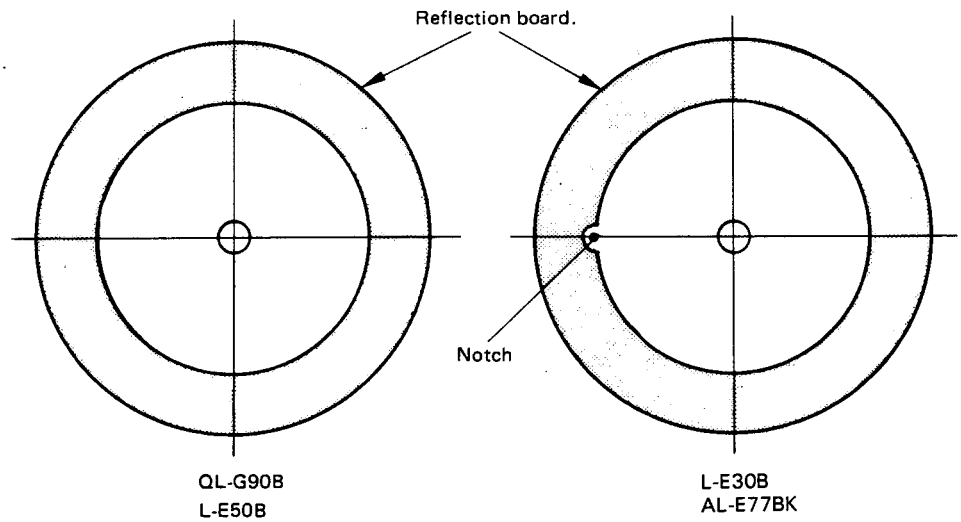
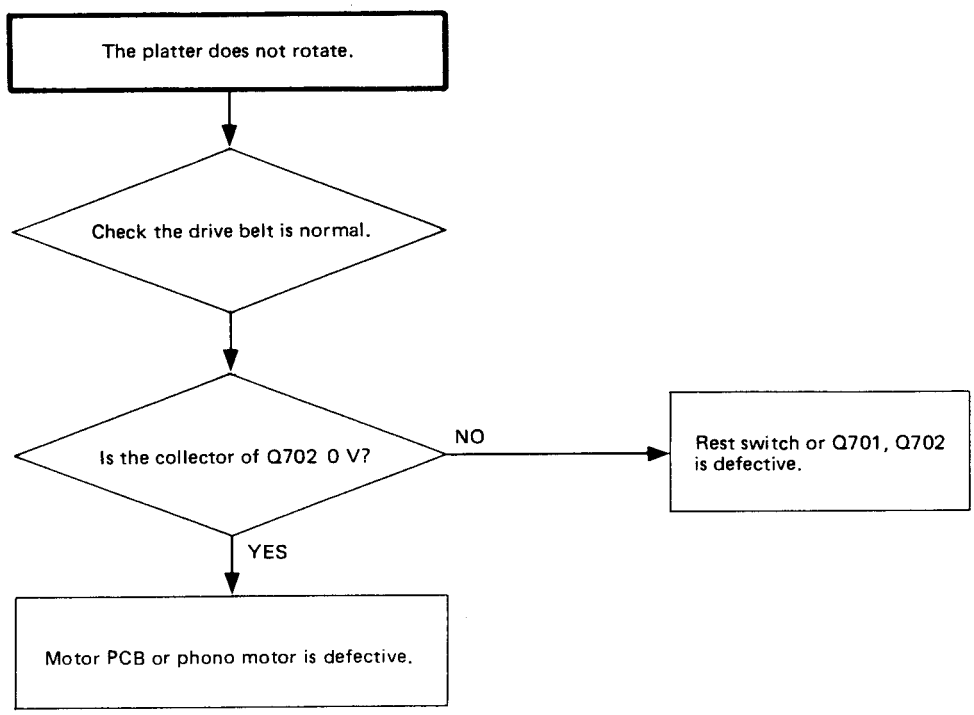
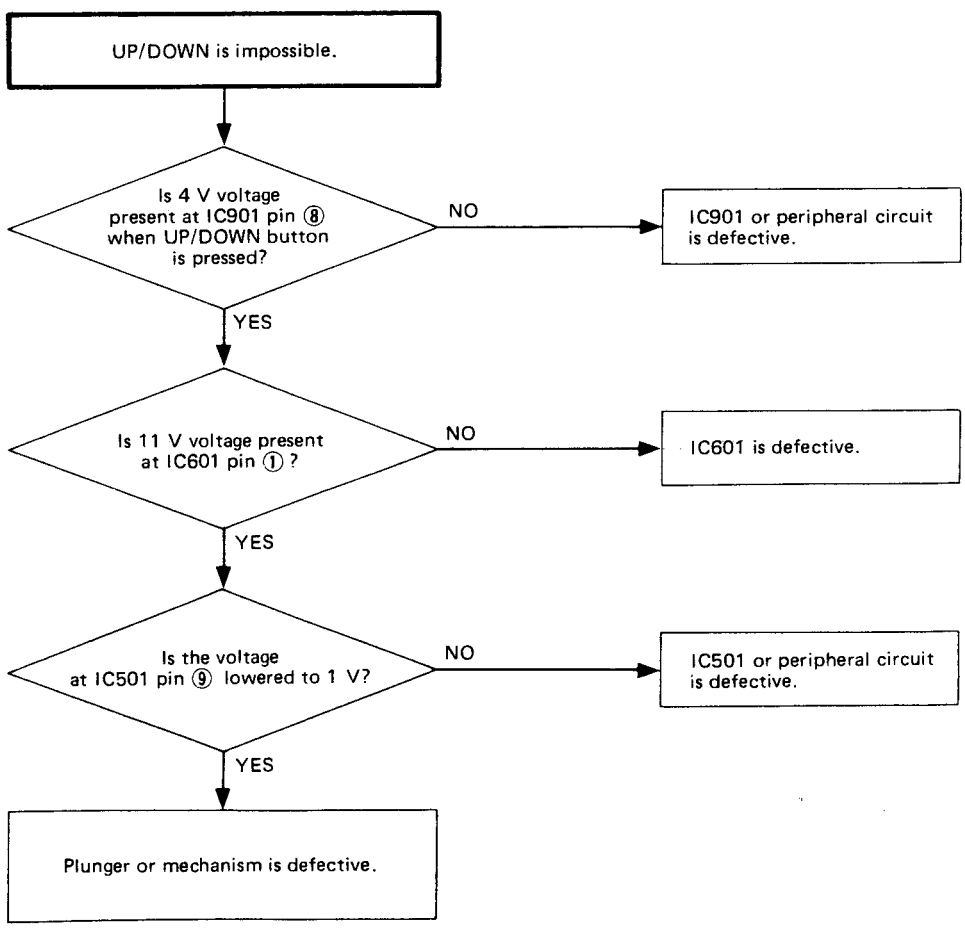
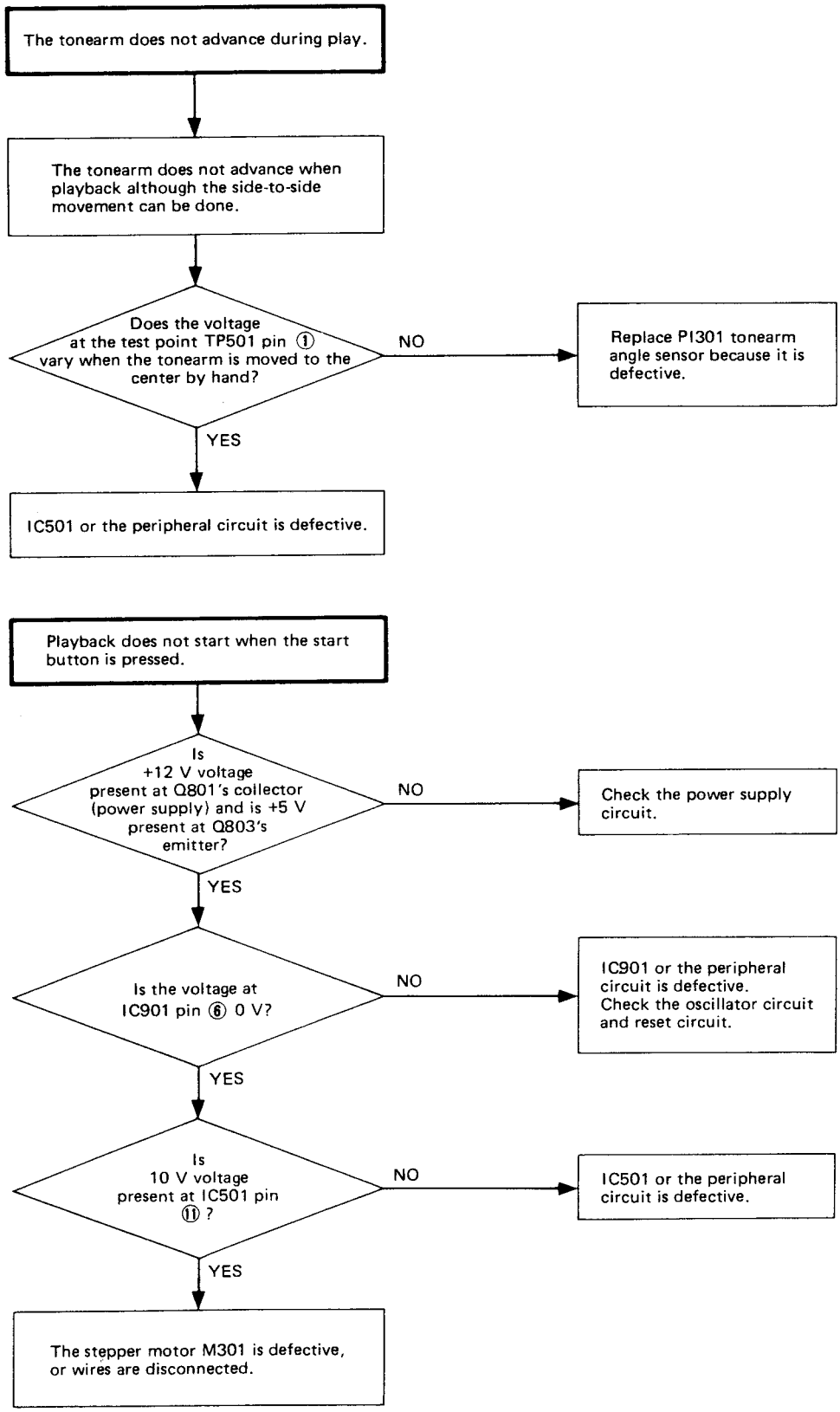


Fig. 11


The platter does not rotate.
Check the drive belt is normal.
Is the collector of Q702 0 V?
NO
Rest switch or Q701, Q702 is defective.
YES
Motor PCB or phono motor is defective.


UP/DOWN is impossible.
Is 4 V voltage present at IC901 pin ⑧ when UP/DOWN button is pressed?
NO
IC901 or peripheral circuit is defective.
YES
Is 11 V voltage present at IC601 pin ① ?
NO
IC601 is defective.
YES
Is the voltage at IC501 pin ⑨ lowered to 1 V?
NO
IC501 or peripheral circuit is defective.
YES
Plunger or mechanism is defective.


The tonearm does not advance during play.
The tonearm does not advance when playback although the side-to-side movement can be done.
Does the voltage at the test point TP501 pin ① vary when the tonearm is moved to the center by hand?
NO
Replace PI301 tonearm angle sensor because it is defective.
YES
IC501 or the peripheral circuit is defective.
Playback does not start when the start button is pressed.
Is +12 V voltage present at Q801's collector (power supply) and is +5 V present at Q803's emitter?
NO
Check the power supply circuit.
YES
Is the voltage at IC901 pin ⑥ 0 V?
NO
IC901 or the peripheral circuit is defective. Check the oscillator circuit and reset circuit.
YES
Is 10 V voltage present at IC501 pin ⑪ ?
NO
IC501 or the peripheral circuit is defective.
YES
The stepper motor M301 is defective, or wires are disconnected.

Carrier Cord Suspension

■ Suspending procedure

After the "Fixing of Tonearm Section" is finished, move the tonearm about 10 mm to the center once and move back it, then tighten screw ⑦ (so that the tension of cord is stabilized with the spring).

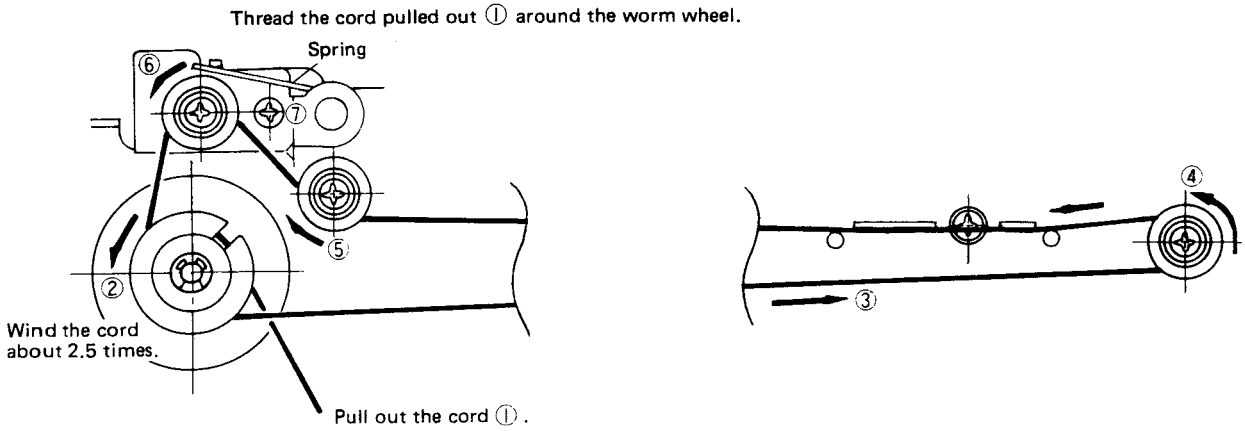


Fig. 12

■ Fixing of Tonearm Section

1. Place the tonearm pivot section so that the gap between the mechanism base and the tonearm pivot section is 3 mm.
2. In this condition, thread the cord under the plastic washer.

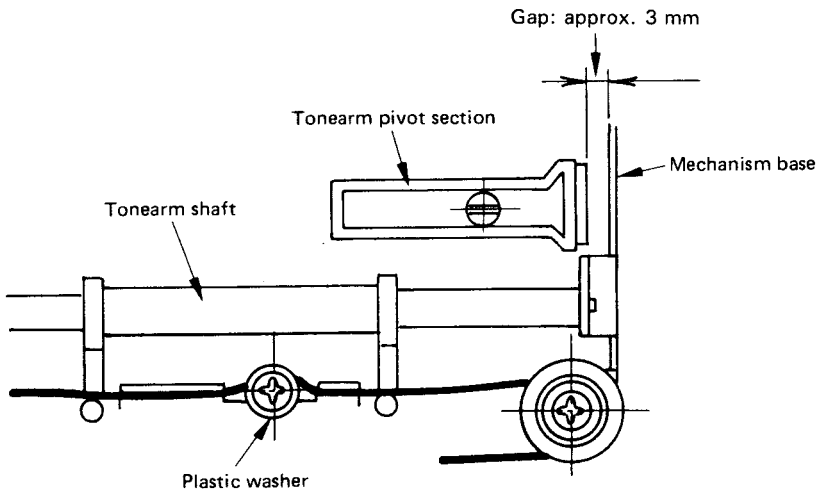
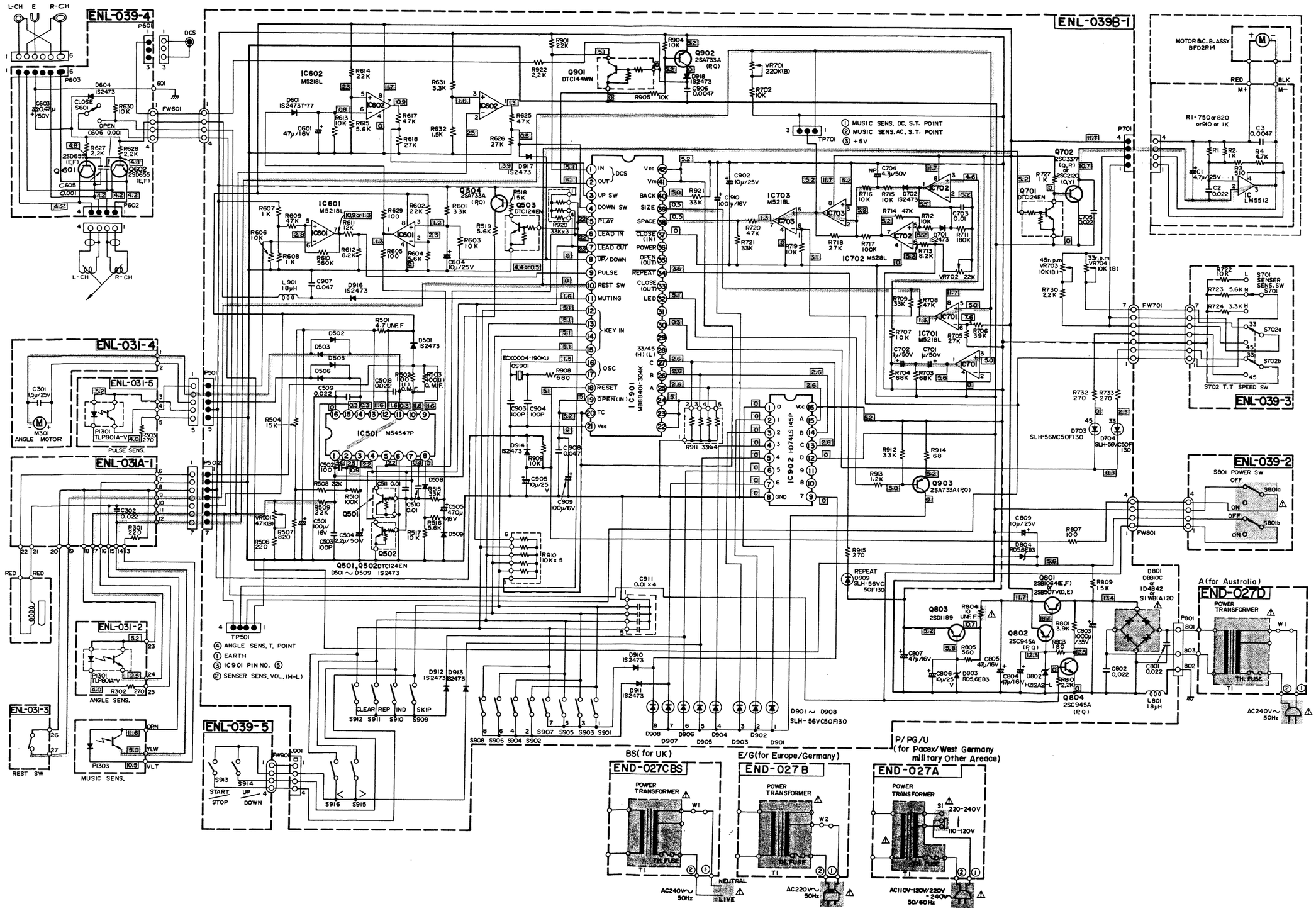


Fig. 13

Schematic Diagram



Connection Diagram

Practical application(s) for Schematic Diagram

1. ▭ shows DC voltage to the chassis with no signal input.
2. —— indicates 12V power supply.
3. ····· indicates 5V power supply.
4. ▭ indicates signal path.
5. When replacing the parts in the darkned are (▭) and those marked with ⚠, be sure to use the designated parts to ensure safety.
6. This is the standard circuit diagram. The design and contents are subject to change without notice.

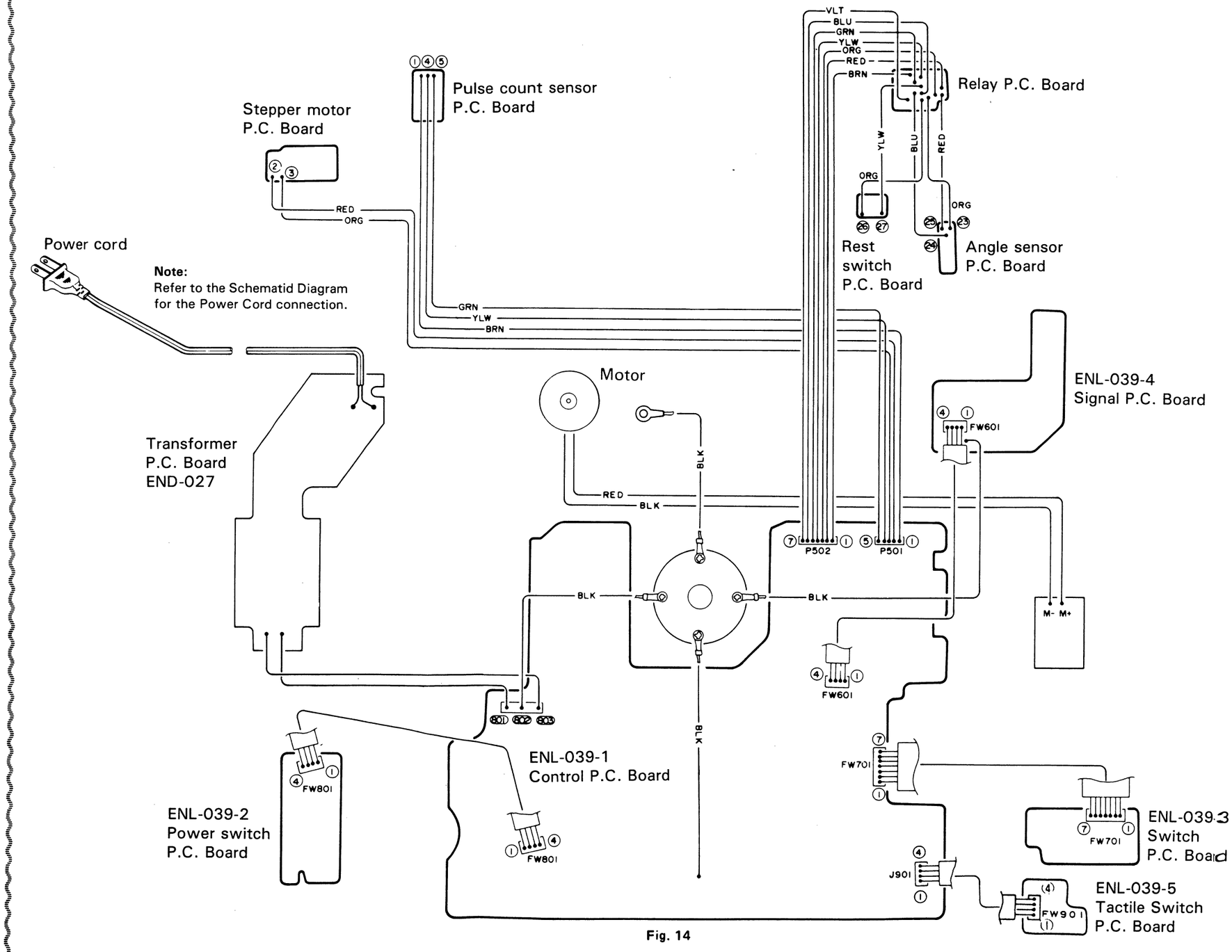


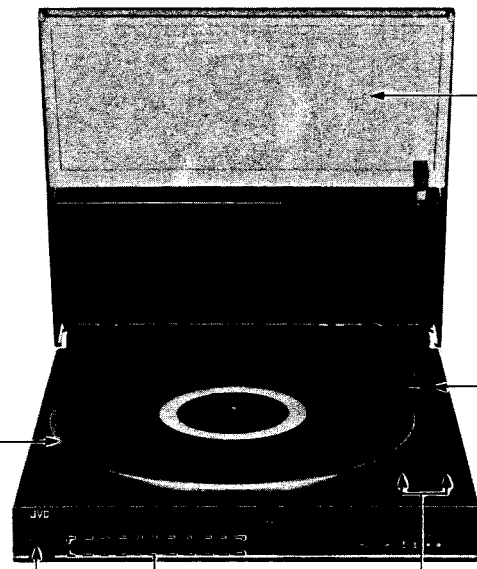
Fig. 14

PARTS LIST

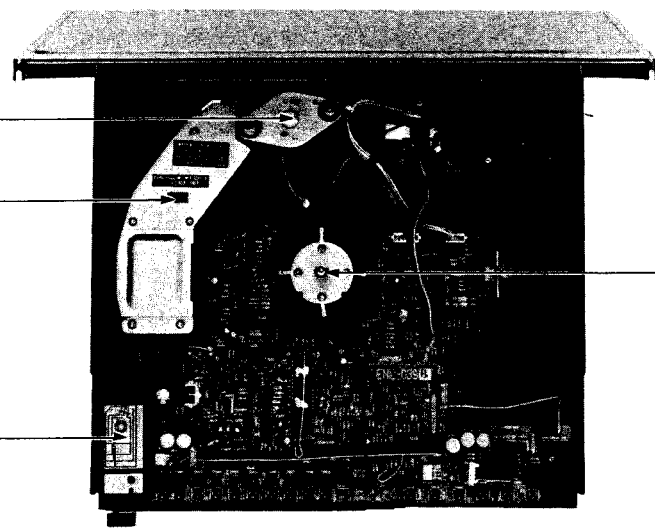
Contents

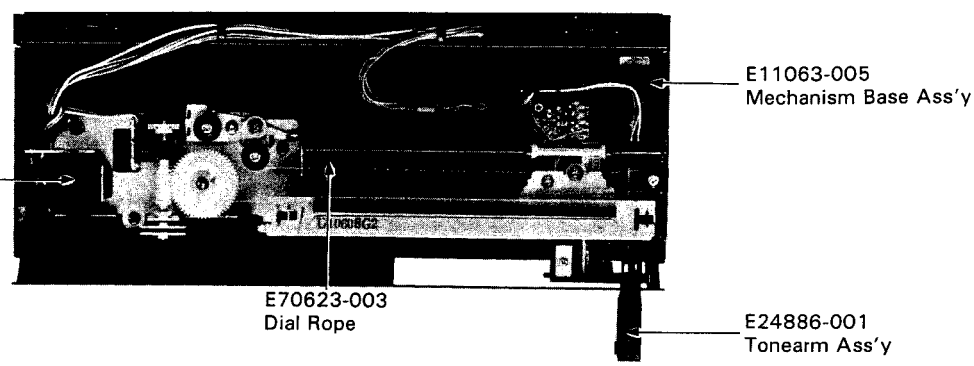
Main Parts Locations

• Front View



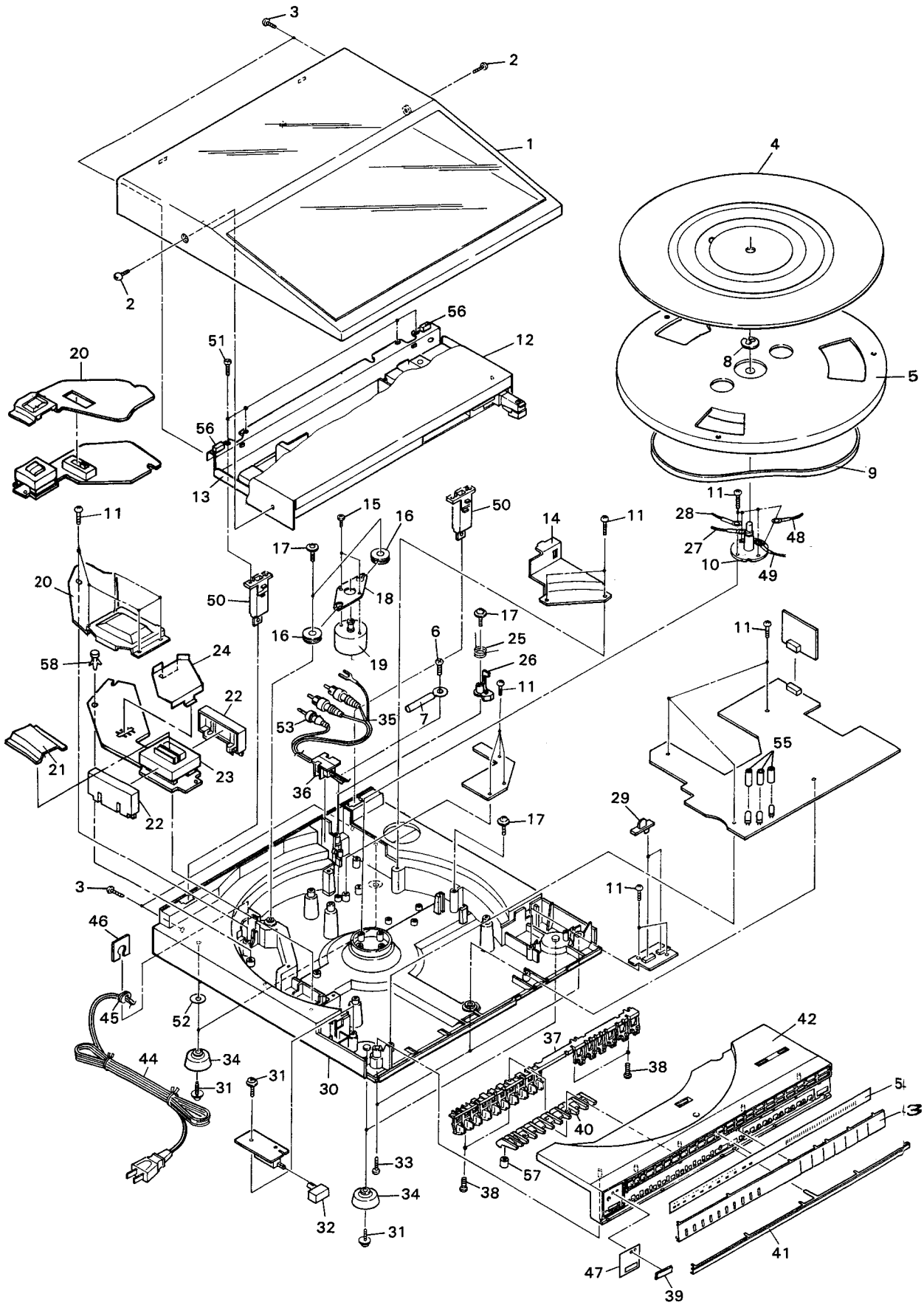
• Top View





⚠ : Safety Parts

Exploded View and Parts List



⚠	Item	Part Number	Part Name	Q'ty	Description	Areas
	1	E10853-009	Dust Cover Ass'y	1		
	2	E70914-002	Screw	2		
	3	SBSB3008M	Screw	4		
	4	E302859-005	Turntable Covering	1		
	5	E24425-004	Turntable	1		
	6	SBSF3010Z	Screw	1		
	7	E72018-001	Wire Clamp	1		E,A,G,BS
	8	REE8000X	E Ring	1		
	9	E69782-001	Belt	1		
	10	E69632-004	Spindle Ass'y	1		
	11	SBSF3010Z	Screw	19		
	12	E24560-009	Cover Sheet	1		
	13	E11063-005	Mechanism Base Ass'y	1		
	14	E70387-006	Cover	1		
	15	SPSP2603Z	Screw	2		
	16	E70401-002	Rubber Bushing	2		
	17	E65923-001	Screw	4		
	18	E70402-002	Motor Base	1		
	19	BFD2R14	Motor	1		
	20	E302789-001	Transformer Cover	1		E,A,G,BS
		E302789-002	Transformer Cover	1		U,P,PG
	21	E70520-001	Cover (A)	1		
	22	E70355-001	Rubber Cushion	2		
⚠	23	ETP1000-38EA	Power Transformer	1		A,E,G
⚠		ETP1000-38LA	Power Transformer	1		U,P,PG
⚠		ETP1000-38EABS	Power Transformer	1		BS
	24	E70521-001	Cover (B)	1		A,E,BS,G
	25	E70354-001	Spring	1		
	26	E70352-002	Switch Lever	1		
	27	EWT011-034	Terminal Wire	1		
	28		Terminal Wire	1	See page 2-6	
	29	E70637-001	Slide Knob	2		
	30	ETA-ALE77BKE	Cabinet Ass'y	1		
	31	E65923-004	Screw	5		
	32	E72445-001	Push Button	1		
	33	SBSF3014Z	Screw	3		
	34	E72652-003	Foot	2	30° (Front)	
		E72652-004	Foot	2	40° (Rear)	
	35	EWP303-002	Signal Cord	1		
	36	A37897	Cord Clamp	1		
	37	E25113-001	Button	1		
	38	SBSF3012Z	Screw	4		
	39	E70912-001	JVC Mark	1		
	40	E303891-001	Reflector	1	L.E.D.	
	41	E303892-001	Fitting	1		
	42	E11179-001	Cabinet Cover			
	43	E303893-002	Ornament	1		
⚠	44	QMP3900-200	Power Cord	1		E,G
⚠		QMP2560-244	Power Cord	1		A
⚠		QMP9017-008BS	Power Cord	1		BS
		QMP7600-250	Power Cord	1		U,P,PG
⚠	45	QHS3876-162	Cord Stopper	1		E,A,G,P,PG,U
⚠		QHS3876-162BS	Cord Stopper	1		BS
	46	E68029-001	C.S. Plate	1		
	47	E72471-001	Panel	1		
	48	EWT011-075	Terminal Wire	1		
	49	EWT011-081	Terminal Wire	1		
	50	E70342-002	Hinge Ass'y	2		
	51	SBST3008M	Screw	4		
	52	Y40434-025	Spacer	2		
	53	EWP802-001	Plug Cord	1		
	54	E303896-002	Front Panel	1		
	55	E72029-002	Spaghetti	3		
	56	E71065-002	Spacer	2		
	57	QXT6730-005	Tube	1		
	58	E48729-003	Plastic Rivet	1		

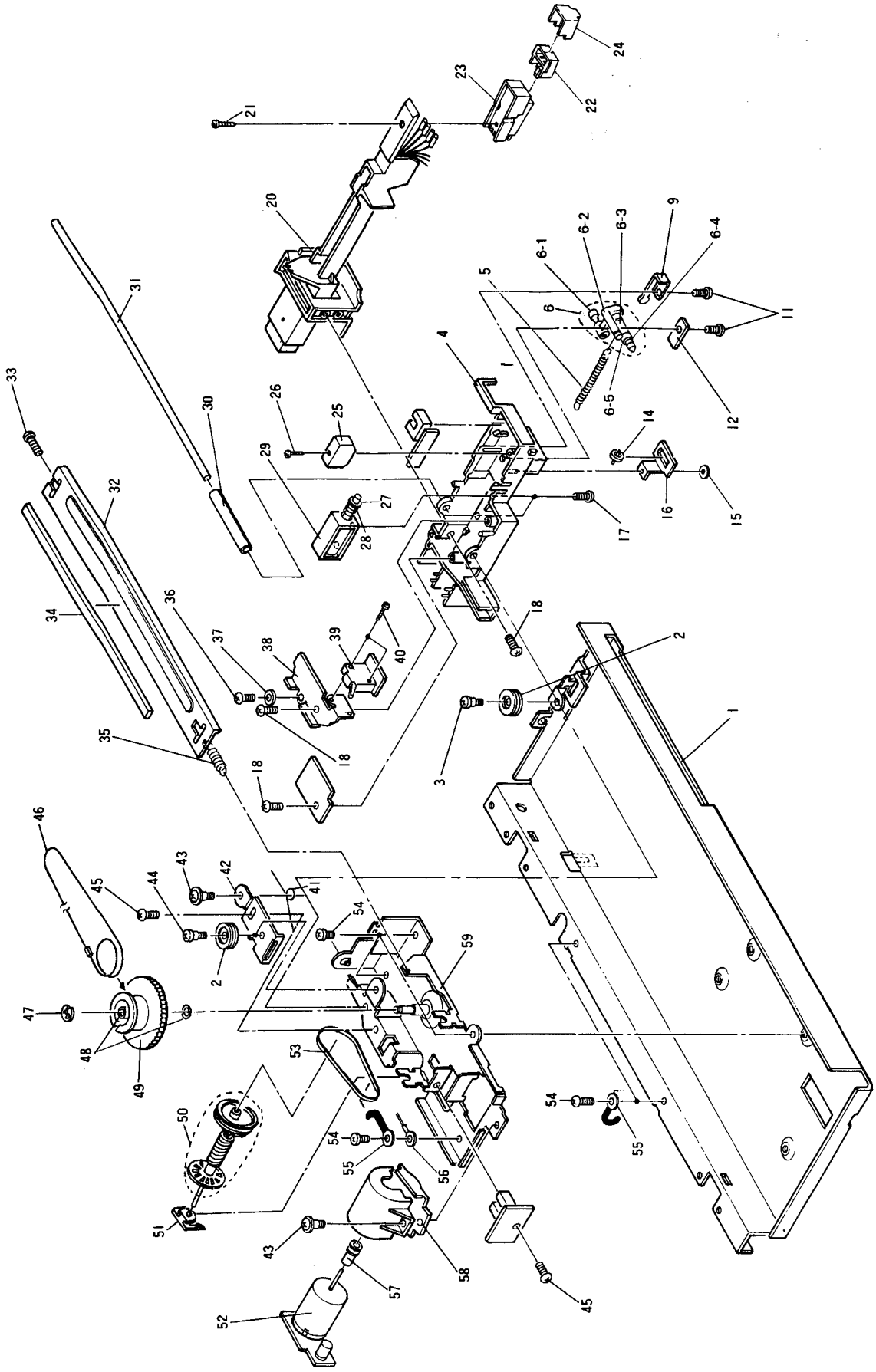
⚠ : Safety parts

The Marks for Designated Areas

A	Australia	BS	U.K.
E	Europe	P,PG	U.S. Military Market
G	West Germany	U	Other Countries

No mark indicates all areas.

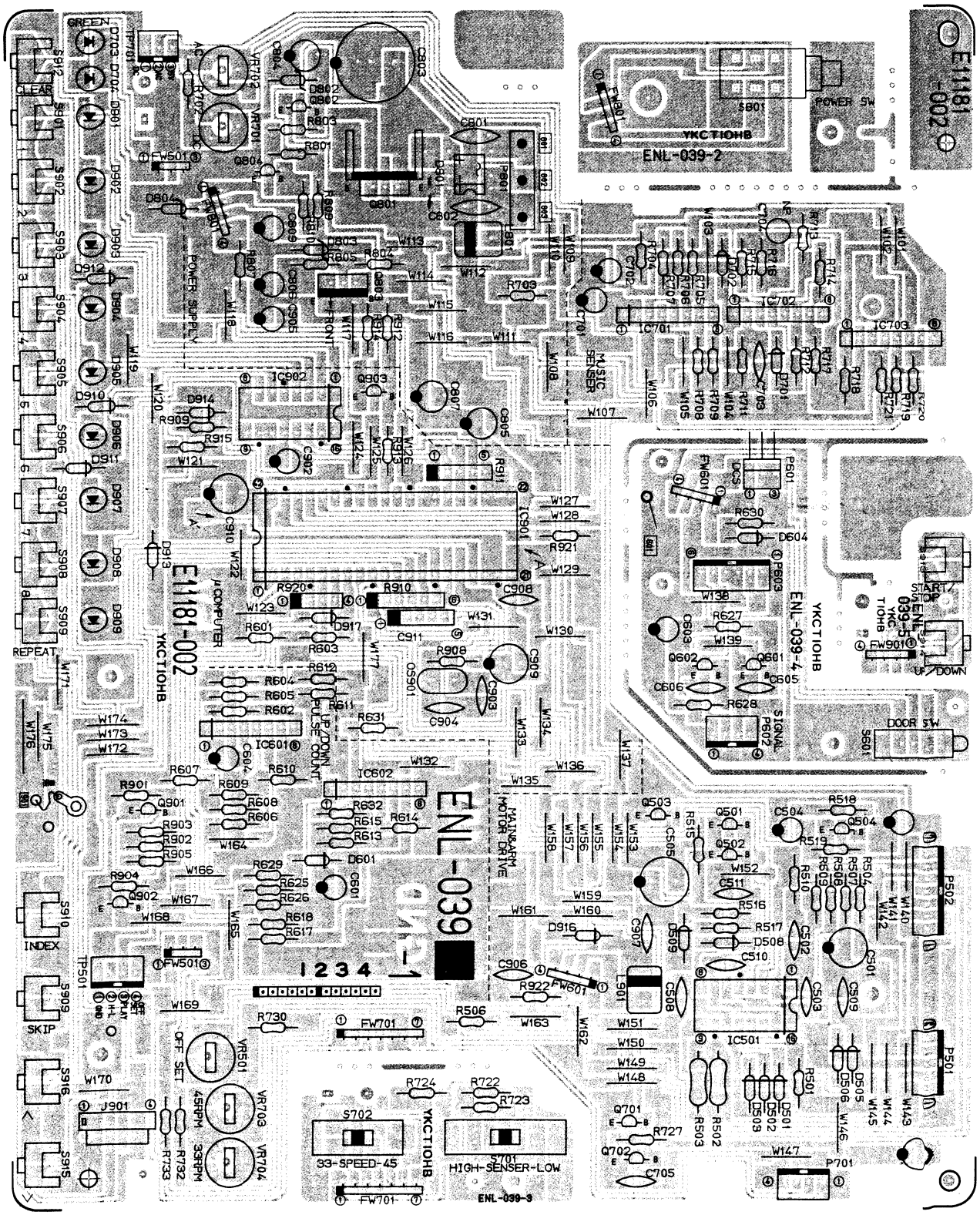
Mechanism Assembly



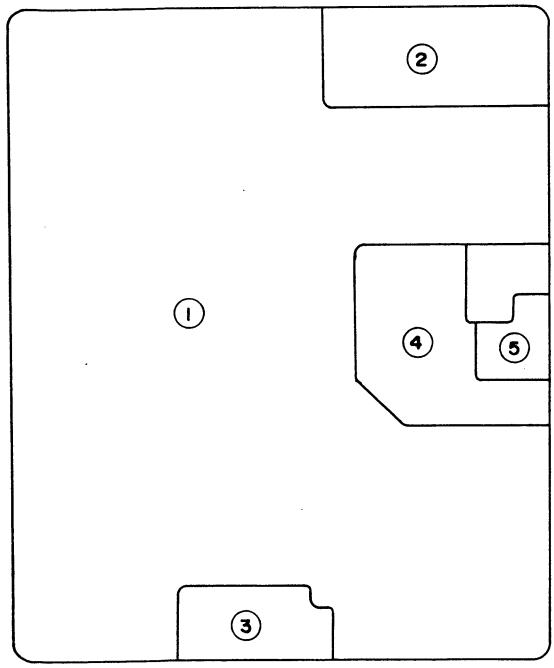
⚠	Item	Part Number	Part Name	Q'ty	Description	Areas
	1	E24423-005	Mechanism Base	1		
	2	E71908-001	Pulley	3		
	3	E70620-001	Screw	1		
	4	E24429-004	Carry Base	1		
	5	E301777-020	Spring	1		
	6	E304178-003	Cueing Lever Ass'y	1		
	6-1	E71869-001	Adjuster	1		
	6-2	E71868-001	Elevator Lever	1		
	6-3	E70362-002	Bush	1		
	6-4	E70361-002	Shaft	1		
	6-5	REE2000X	E Ring	1		
	9	E71867-001	Spring	1		
	11	SPSF2606Z	Screw	2		
	12	E70371-001	Plate	1		
	14	E70369-001	Carry Roller	1		
	15	RDS2000F	C.S. Ring	1		
	16	E70377-001	Roller Bracket	1		
	17	SDSP2004Z	Screw	2		
	18	SBSF3008Z	Screw	3		
	20	E24886-001	Tonearm Ass'y	1		
	21	SPSB2006M	Screw	1		
	22	DT-56 (E)	Stylus	1		
	23	MD1056Z	Cartridge	1		
	24	E71909-001	Cover	1		
	25	E71987-001	Weight	1		
	26	SPSF2608Z	Screw	1		
	27	E70383-001	Cap	1		
	28	E66722-022	Spring	1		
	29	ENZ3002-002	Solenoid	1		
	30	E70649-001	Bush	1		
	31	E70348-001	Carry Shaft	1		
	32	E71866-002	Adjust Bracket	1		
	33	SBST3008M	Screw			
	34	E71065-001	Spacer	1		
	35	E301777-006	Spring	1		
	36	GBST3006Z	Screw	1		
	37	Y40434-026	Washer	1		
	38	E71870-001	Switch Bracket	1		
	39	QSS1201-034	Slide Switch	1		
	40	SPSP2008Z	Screw	2		
	41	E71865-001	Spling	1		
	42	E71864-001	Roller Bracket	1		
	43	E69851-004	Screw	2		
	44	E70620-001	Screw	2		
	45	SBST3006Z	Screw	2		
	46	E70623-003	Dial Rope	1		
	47	REE3000X	E Ring	1		
	48	Q03093-817	Washer	2		
	49	E303606-001	Worm Wheel	1		
	50	E302856-001	Worm Ass'y	1		
	51	E69875-001	Worm W Ass'y	1		
	52	E300763-005	Motor	1		
	53	E69879-001	Belt	1		
	54	SDST3005M	Screw	2		
	55	PU49485-1	Wire Clamp	2		
	56	EWT021-011	Terminal Wire	1		
	57	E67824-004	Pulley	1		
	58	E302854-002	Motor Holder	1		
	59	E303605-001	Feed Base Sub Ass'y	1		

Printed Circuit Boarrd Ass'y and Parts List

■ ENL-039B Main P.C. Board Ass'Y



Each Individual P.C. Board Location



① ENL-039-1
Control P.C. Board
② ENL-039-2
Power Switch P.C. Board
③ ENL-039-3
Switch P.C. Board
④ ENL-039-4
Signal P.C. Board
⑤ ENL-039-5
Tack Switch P.C. Board

Transistors

⚠	ITEM	PART NUMBER	DESCRIPTION	MAKER	AREA
	Q501	DTC124EN	SILICON	ROHM	
	Q502	DTC124EN	SILICON	ROHM	
	Q503	DTC124EN	SILICON	ROHM	
	Q504	2SA733A(P,Q)	SILICON	NEC	
	Q601	2SD655(E,F)	SILICON	HITACHI	
	Q602	2SD655(E,F)	SILICON	HITACHI	
	Q701	DTC124EN	SILICON	ROHM	
	Q702	2SC3377(Q,R)	SILICON	ROHM	
	Q801	2SB1064(E,F)	SILICON	ROHM	
	Q802	2SC945A(P,Q)	SILICON	NEC	
	Q803	2SD1189(Q,R)	SILICON	ROHM	
	Q804	2SC945A(P,Q)	SILICON	NEC	
	Q901	DTC144WN	SILICON	ROHM	
	Q902	2SA733A(P,Q)	SILICON	NEC	
	Q903	2SA733A(P,Q)	SILICON	NEC	

I.C.S.

⚠	ITEM	PART NUMBER	DESCRIPTION	MAKER	AREA
	IC501	M54547P	I.C.	MITSUBISHI	
	IC601	M5218L	I.C.	MITSUBISHI	
	IC602	M5218L	I.C.	MITSUBISHI	
	IC701	M5218L	I.C.	MITSUBISHI	
	IC702	M5218L-V	I.C.	MITSUBISHI	
	IC703	M5218L	I.C.	MITSUBISHI	
	IC901	MB88401M-304K	I.C.		
	IC902	HD74LS145P	I.C.	HITACHI	

Diodes

⚠	ITEM	PART NUMBER	DESCRIPTION	MAKER	AREA
	D501	1S2473	SILICON	ROHM	
	D502	1S2473	SILICON	ROHM	
	D503	1S2473	SILICON	ROHM	
	D505	1S2473	SILICON	ROHM	
	D506	1S2473	SILICON	ROHM	
	D508	1S2473	SILICON	ROHM	
	D509	1S2473	SILICON	ROHM	
	D601	1S2473	SILICON	ROHM	
	D604	1S2473	SILICON	ROHM	
	D701	1S2473	SILICON	ROHM	
	D702	1S2473	SILICON	ROHM	
	D703	SLH-56MC50F130	L.E.D.	ROHM	
	D704	SLH-56VC50F130	L.E.D.	ROHM	
	D801	DBB10C	SILICON	SANYO	
	D802	HZ12A2-L	SILICON	HITACHI	
	D803	RD5.6EB3	ZENER	NEC	
	D804	RD5.6EB3	ZENER	NEC	
	D901	SLH-56VC50F130	L.E.D.	ROHM	
	D902	SLH-56VC50F130	L.E.D.	ROHM	
	D903	SLH-56VC50F130	L.E.D.	ROHM	
	D904	SLH-56VC50F130	L.E.D.	ROHM	
	D905	SLH-56VC50F130	L.E.D.	ROHM	
	D906	SLH-56VC50F130	L.E.D.	ROHM	
	D907	SLH-56VC50F130	L.E.D.	ROHM	
	D908	SLH-56VC50F130	L.E.D.	ROHM	
	D909	SLH-56VC50F130	L.E.D.	ROHM	
	D910	1S2473	SILICON	ROHM	
	D911	1S2473	SILICON	ROHM	
	D912	1S2473	SILICON	ROHM	
	D913	1S2473	SILICON	ROHM	
	D914	1S2473	SILICON	ROHM	
	D916	1S2473	SILICON	ROHM	
	D917	1S2473	SILICON	ROHM	
	D918	1S2473	SILICON	ROHM	

Capacitors

⚠	ITEM	PART NUMBER	DESCRIPTION			AREA
	C501	QETB1CM-107	100MF	16V	ELECTRO	
	C502	QCS21HJ-101	100PF	50V	CERAMIC	
	C503	QCS21HJ-101	100PF	50V	CERAMIC	
	C504	QETB1HM-225	2.2MF	50V	ELECTRO	
	C505	QETB1CM-477	470MF	16V	ELECTRO	
	C508	QCF21HP-223	0.022MF	50V	CERAMIC	
	C509	QCF21HP-223	0.022MF	50V	CERAMIC	
	C510	QCF21HP-103	0.01MF	50V	CERAMIC	
	C511	QCF21HP-103	0.01MF	50V	CERAMIC	
	C601	QETB1CM-476	47MF	16V	ELECTRO	
	C603	QETB1HM-474	0.47MF	50V	ELECTRO	
	C604	QETB1EM-106	10MF	25V	ELECTRO	
	C605	QCY21HK-102	1000PF	50V	CERAMIC	
	C606	QCY21HK-102	1000PF	50V	CERAMIC	
	C701	QETB1HM-105	1MF	50V	ELECTRO	
	C702	QETB1HM-105	1MF	50V	ELECTRO	
	C703	QCF21HP-103	0.01MF	50V	CERAMIC	
	C704	QEN51HM-475	4.7MF	50V	NON POLE	
	C705	QCF21HP-223	0.022MF	50V	CERAMIC	
	C801	QCF21HP-223	0.022MF	50V	CERAMIC	
	C802	QCF21HP-223	0.022MF	50V	CERAMIC	
	C803	QETB1VM-108	1000MF	35V	ELECTRO	
	C804	QETB1CM-476	47MF	16V	ELECTRO	
	C805	QETB1CM-476	47MF	16V	ELECTRO	
	C806	QETB1EM-106	10MF	25V	ELECTRO	
	C807	QETB1CM-476	47MF	16V	ELECTRO	
	C809	QETB1EM-106	10MF	25V	ELECTRO	
	C902	QETB1EM-106	10MF	25V	ELECTRO	
	C903	QCT26CH-101	100PF	50V	CERAMIC	
	C904	QCT26CH-101	100PF	50V	CERAMIC	
	C905	QETB1EM-106	10MF	25V	ELECTRO	
	C906	QCF21HP-472	4700PF	50V	CERAMIC	
	C907	QCF21HP-473	0.047MF	50V	CERAMIC	
	C908	QCF21HP-473	0.047MF	50V	CERAMIC	
	C909	QETB1CM-107	100MF	16V	ELECTRO	
	C910	QETB1CM-107	100MF	16V	ELECTRO	
	C911	ECGS4XZ-103				

Resistors

⚠	ITEM	PART NUMBER	DESCRIPTION			AREA
⚠	R501	QRZ0061-4R7	4.7		FUSIBLE	
⚠	R502	QRG012J-101AM	100	1W	O.M.FILM	
⚠	R503	QRG012J-101AM	100	1W	O.M.FILM	
	R504	QRD148J-153S	15K	1/4W	CARBON	
	R506	QRD148J-221S	220	1/4W	CARBON	
	R507	QRD148J-821S	820	1/4W	CARBON	
	R508	QRD148J-223S	22K	1/4W	CARBON	
	R509	QRD148J-223S	22K	1/4W	CARBON	
	R510	QRD148J-104S	100K	1/4W	CARBON	
	R515	QRD148J-333S	33K	1/4W	CARBON	
	R516	QRD148J-562S	5.6K	1/4W	CARBON	
	R517	QRD148J-103S	10K	1/4W	CARBON	
	R518	QRD148J-153S	15K	1/4W	CARBON	
	R519	QRD148J-562S	5.6K	1/4W	CARBON	
	R601	QRD148J-333S	33K	1/4W	CARBON	
	R602	QRD148J-223S	22K	1/4W	CARBON	
	R603	QRD148J-103S	10K	1/4W	CARBON	
	R604	QRD148J-562S	5.6K	1/4W	CARBON	
	R605	QRD148J-101S	100	1/4W	CARBON	
	R606	QRD148J-103S	10K	1/4W	CARBON	
	R607	QRD148J-102S	1K	1/4W	CARBON	
	R608	QRD148J-102S	1K	1/4W	CARBON	
	R609	QRD148J-473S	47K	1/4W	CARBON	
	R610	QRD148J-564S	560K	1/4W	CARBON	
	R611	QRD148J-123S	12K	1/4W	CARBON	
	R612	QRD148J-822S	8.2K	1/4W	CARBON	
	R613	QRD148J-103S	10K	1/4W	CARBON	
	R614	QRD148J-223S	22K	1/4W	CARBON	
	R615	QRD148J-562S	5.6K	1/4W	CARBON	
	R617	QRD148J-473S	47K	1/4W	CARBON	
	R618	QRD148J-273S	27K	1/4W	CARBON	
	R625	QRD148J-473S	47K	1/4W	CARBON	
	R626	QRD148J-273S	27K	1/4W	CARBON	
	R627	QRD148J-222S	2.2K	1/4W	CARBON	
	R628	QRD148J-222S	2.2K	1/4W	CARBON	
	R629	QRD148J-101S	100	1/4W	CARBON	
	R630	QRD148J-103S	10K	1/4W	CARBON	
	R631	QRD148J-332S	3.3K	1/4W	CARBON	
	R632	QRD148J-152S	1.5K	1/4W	CARBON	
	R702	QRD148J-103S	10K	1/4W	CARBON	
	R703	QRD148J-683S	68K	1/4W	CARBON	
	R704	QRD148J-683S	68K	1/4W	CARBON	
	R705	QRD148J-273S	27K	1/4W	CARBON	
	R706	QRD148J-393S	39K	1/4W	CARBON	
	R707	QRD148J-103S	10K	1/4W	CARBON	
	R708	QRD148J-473S	47K	1/4W	CARBON	
	R709	QRD148J-333S	33K	1/4W	CARBON	
	R711	QRD148J-184S	180K	1/4W	CARBON	
	R712	QRD148J-103S	10K	1/4W	CARBON	
	R713	QRD148J-822S	8.2K	1/4W	CARBON	
	R714	QRD148J-473S	47K	1/4W	CARBON	
	R715	QRD148J-103S	10K	1/4W	CARBON	
	R716	QRD148J-103S	10K	1/4W	CARBON	
	R717	QRD148J-104S	100K	1/4W	CARBON	
	R718	QRD148J-273S	27K	1/4W	CARBON	
	R719	QRD148J-103S	10K	1/4W	CARBON	
	R720	QRD148J-473S	47K	1/4W	CARBON	
	R721	QRD148J-333S	33K	1/4W	CARBON	
	R722	QRD148J-103S	10K	1/4W	CARBON	
	R723	QRD148J-562S	5.6K	1/4W	CARBON	
	R724	QRD148J-332S	3.3K	1/4W	CARBON	
	R727	QRD148J-102S	1K	1/4W	CARBON	
	R730	QRD148J-222S	2.2K	1/4W	CARBON	
	R732	QRD148J-271S	270	1/4W	CARBON	
	R733	QRD148J-271S	270	1/4W	CARBON	
	R801	QRD148J-392S	3.9K	1/4W	CARBON	
	R803	QRD148J-181S	180	1/4W	CARBON	
⚠	R804	QRZ0062-100	10	1/4W	FUSIBLE	
	R805	QRD148J-561S	560	1/4W	CARBON	
	R807	QRD148J-101S	100	1/4W	CARBON	
	R809	QRD148J-153S	15K	1/4W	CARBON	
	R810	QRD148J-222S	2.2K	1/4W	CARBON	
	R901	QRD148J-223S	22K	1/4W	CARBON	
	R904	QRD148J-103S	10K	1/4W	CARBON	
	R905	QRD148J-103S	10K	1/4W	CARBON	
	R908	QRD148J-681S	680	1/4W	CARBON	
	R909	QRD148J-103S	10K	1/4W	CARBON	
	R910	QRB055J-103	10K	5W	ARRAY	
	R911	QRB045J-333	33K	4W	ARRAY	
	R912	QRD148J-333S	33K	1/4W	CARBON	
	R913	QRD148J-122S	1.2K	1/4W	CARBON	
	R914	QRD148J-390S	39	1/4W	CARBON	
	R915	QRD148J-271S	270	1/4W	CARBON	
	R920	QRB035J-333	33K	3W		
	R921	QRD148J-333S	33K	1/4W	CARBON	
	R922	QRD148J-222S	2.2K	1/4W	CARBON	
	VR501	QVP4A0B-472			VARIABLE	
	VR701	QVP4A0B-224			VARIABLE	
	VR702	QVP4A0B-223			VARIABLE	
	VR703	QVP4A0B-103			VARIABLE	
	VR704	QVP4A0B-103			VARIABLE	

⚠ : Safety Parts

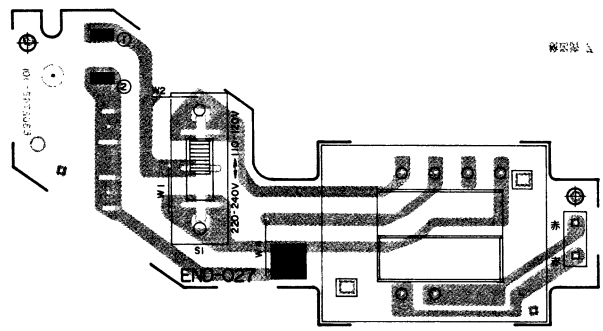
Others

⚠	ITEM	PART NUMBER	DESCRIPTION	AREA
		EWT011-075	TERMINAL WIRE	
		EWT011-081	TERMINAL WIRE	
		E11181-002	CIRCUIT BOARD	
		E67764-103	TERMINAL	
		E70516-001	HEAT SINK	
		SBSB3008Z	SCREW	
	J901	E04365-004	SOCKET ASSY	
	L801	EQL3001-180KY	INDUCTOR	
	L901	EQL3001-180KY	INDUCTOR	
	P501	QMV5005-005K	PULAG ASSY	
	P502	QMV5005-007K	PULAG ASSY	
	P601	QMV5004-003K	PULAG ASSY	
	P602	QMV5005-004K	PULAG ASSY	
	P603	QMV5005-006K	PULAG ASSY	
	P701	QMV5005-004K	PULAG ASSY	
	S601	QSP0029-001	PUSH SWITCH	
	S701	QSS2301-011	SLIDE SWITCH	
	S702	QSS2201-012	SLIDE SWITCH	
⚠	S801	QST4101-E17	PUSH SWITCH	
	S901	ESP0001-010	PUSH SWITCH	
	S902	ESP0001-010	PUSH SWITCH	
	S903	ESP0001-010	PUSH SWITCH	
	S904	ESP0001-010	PUSH SWITCH	
	S905	ESP0001-010	PUSH SWITCH	
	S906	ESP0001-010	PUSH SWITCH	
	S907	ESP0001-010	PUSH SWITCH	
	S908	ESP0001-010	PUSH SWITCH	
	S909	ESP0001-010	PUSH SWITCH	
	S910	ESP0001-010	PUSH SWITCH	
	S911	ESP0001-010	PUSH SWITCH	
	S912	ESP0001-010	PUSH SWITCH	
	S913	ESP0001-010	PUSH SWITCH	
	S914	ESP0001-010	PUSH SWITCH	
	S915	ESP0001-010	PUSH SWITCH	
	S916	ESP0001-010	PUSH SWITCH	
	OS901	ECX0004-190KU	RESONATOR	
	TP501	QMV5005-004K	PULAG ASSY	
	TP701	QMV5005-003K	PULAG ASSY	

⚠ : Safety Parts

■ END-027□ Switch & Trans P.C. Board Ass'y

Note : END-027□ Varies according to the areas employed. See Note (1) when placing an order.



Note (1)

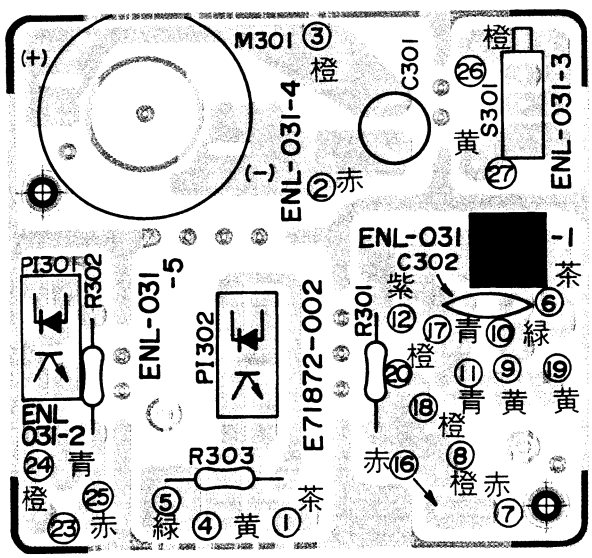
P.C. Board Ass'y	Designated Areas
END-027 A	U.S. Military Market & Other Countries
END-027 B	Europe & West Germany
END-027 CBS	U.K
END-027 D	Australia

OTHERS

⚠	ITEM	PART NUMBER	DESCRIPTION	AREA
⚠		ETP1000-38EA	POWER TRANSFORM	B
⚠		ETP1000-38EA	POWER TRANSFORM	D
⚠		ETP1000-38EABS	POWER TRANSFORM	CBS
⚠		ETP1000-38LA	POWER TRANSFORM	A
⚠		QSS2228-103	VOLTAGE SELECTOR	
		E302748-101	CIRCUIT BOARD	A
		E302748-101	CIRCUIT BOARD	B
		E302748-101	CIRCUIT BOARD	D
		E302748-101BS	CIRCUIT BOARD	CBS
		E65508-002	TAB	
		E67764-102	TERMINAL ASSY	

⚠ : SAFETY PARTS

■ ENL-031A Mecha P.C. Board Ass'y



Capacitors

⚠	ITEM	PART NUMBER	DESCRIPTION			AREA
	C301	QCZ0202-155	1.5MF	25V	CERAMIC	
	C302	QCF21HP-223	0.022MF	50V	CERAMIC	

Resistors

⚠	ITEM	PART NUMBER	DESCRIPTION			AREA
	R301	QRD148J-221S	220	1/4W	CARBON	
	R302	QRD148J-271S	270	1/4W	CARBON	
	R303	QRD148J-271S	270	1/4W	CARBON	

Others

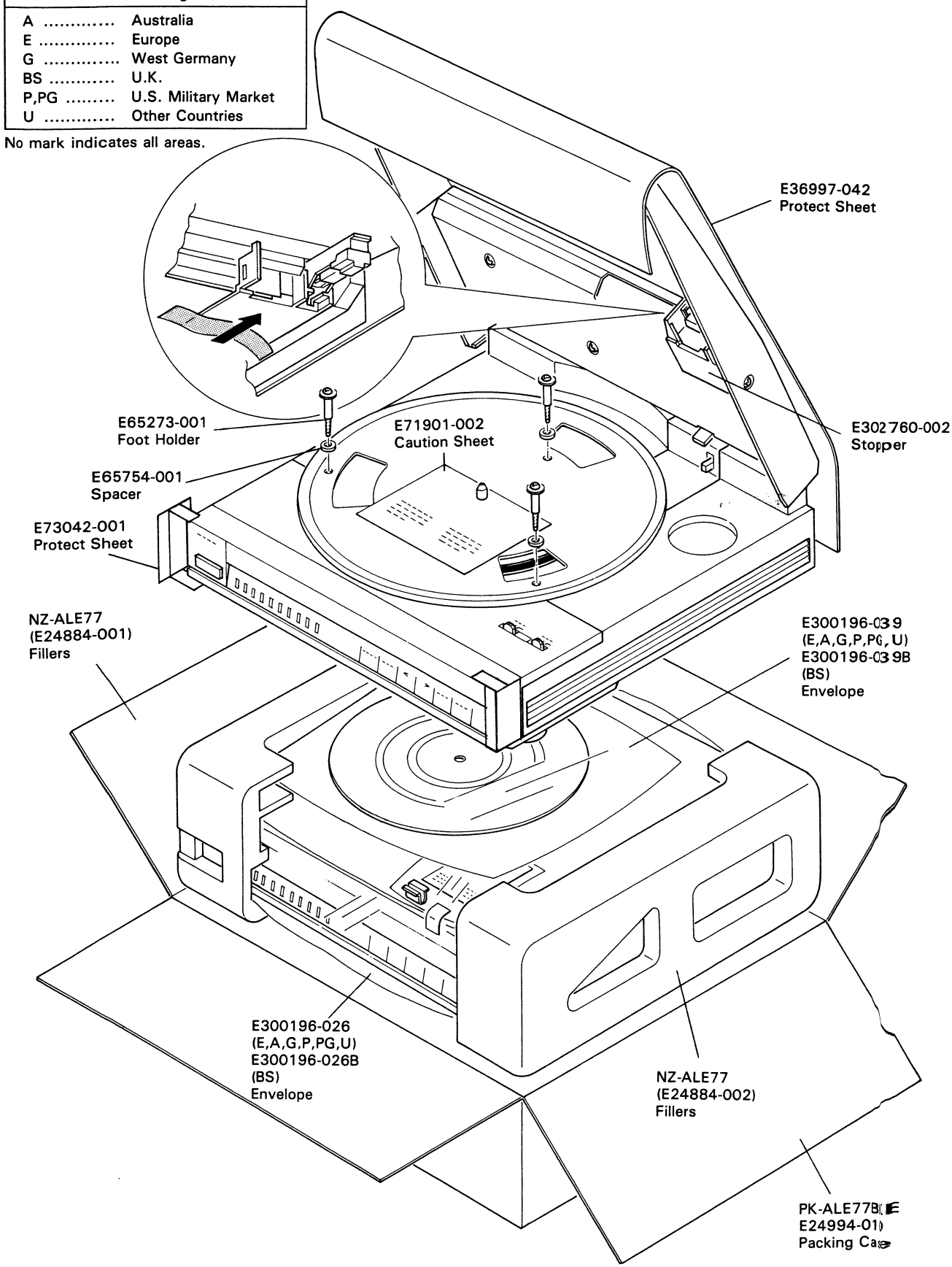
⚠	ITEM	PART NUMBER	DESCRIPTION	AREA
		EWP203-015	CORD ASS'Y	
		E71872-022	CRICUIT BOARD	
	S301	QSS1201-034	SRIDE SWITCH	
	PI301	TLP801A-V1	INTERRUPTOR	
	PI302	TLP801A-V1 or V2	INTERRUPTOR	

Note (1)
The symbols (赤,黒,白 ... etc) on P.C. Board surface are factory process only.

Packing Materials and Part Numbers

The Marks for Designated Areas	
A	Australia
E	Europe
G	West Germany
BS	U.K.
P,PG	U.S. Military Market
U	Other Countries

No mark indicates all areas.



Accessories List

⚠	Part Number	Part Name	Description	Areas
	E30580-1274A	Instruction Book		Except BS
	E30580-1274ABS	Instruction Book		BS only
	BT20047C	Warranty Card		P,PG
	BT20029C	Warranty Card		
	BT20060	Warranty Card		BS
	BT20064	Warranty Card		G
	BT20071A	Service Center List		C
	BT20046B	Service Information Card		P,PG
	BT20066	EEC Agency		BS,G
⚠	E04056	Siemens Plug		U,PG
	E66329-001	EP Adaptor		
	E72053-001	Hook		
	E300196-010	Envelope		Except Bs
	E300196-010B	Envelope		BS only
	QPGA007-00805	Envelope		
	E303919-01	Stand		
	E303919-002	Stand		

⚠ : Safety Parts

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